THE POTOMAC RIVER AS THE NATURAL BARRIER FOR OXYDENDRUM, GALAX AND HEXASTYLIS

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In my studies of the flora of central eastern United States, three genera are remarkable in their distribution in that they are found only south and west of the Potomac River. In 1956 I called attention to this peculiar distribution for Hexastylis virginica and Galax aphylla when discussing the range of Eumeces inexpectatus (Herpetologica, 12: 136. 1956). This lizard has the southern shore of the Potomac River on Northern Neck as its northern limit. The range in Virginia for this lizard is mainly along the western edge of the Chesapeake Bay (Princess Anne, Norfolk, Nansemond, Southampton, Isle of Wight, James City, New Kent, Nottoway, King and Queen and Northumberland Counties; the Alleghany Co. record is in error). Galax aphylla and Hexastylis virginica have the same distribution along the western edge of the Chesapeake Bay, and then up the Potomac River to the 'bend', and then westward. Oxydendrum arboreum does get across the Chesapeake Bay to southern Delmarva and around Maryland to the west into southwestern Pennsylvania. In the present paper the Potomac River is indicated as the northern limit or northern natural barrier for Oxydendrum, Galax and Hexastylis in central eastern United States. In a later paper some 400 species of plants will be treated which find Delmarva, Maryland, Virginia and West Virginia as their northern limit for distribution in eastern United States.

I wish to thank the curators of the United States National Herbarium, the Carnegie Museum, Pittsburgh, and the herbarium of the West Virginia University for permitting me to study or annotate their specimens of these genera. All other specimens cited are in the Reed Herbarium unless otherwise noted.

Oxydendrum arboreum (L.) DC.

The sourwood belongs to the family Ericaceae. It is a small tree with racemes of white flowers at the tips of the branches during the summer. In the fall the foliage turns a brilliant red before the leaves fall off. The racemes of pyramidal capsules stay on the trees all winter and usually absciss in the spring when the new buds expand. Map 1.

* Reed Herbarium, 10105 Harford Road, Baltimore 34, Maryland.

Sourwood ranges from Florida to Louisiana, then northward to Maryland on the Delmarva Peninsula (Worcester Co.) and to southern Assateague Island; throughout Virginia south and west of the Potomac River and its tributaries, then up into western Pennsylvania by way of West Virginia, and westward into Kentucky, Ohio and Indiana. No specimens of sourwood have been recorded in the wild from Maryland (except the single specimen from southern Worcester Co.), either on the Delmarva Peninsula or north of the Potomac River. Massey (1961, p. 159) gives the range in Virginia as general in the state. listing 21 counties. Strausbaugh & Core (1958, p. 706) state the species is found in all sections of West Virginia west of the Alleghenies.

Specimens representing the distribution of sourwood on the Delmarva Peninsula are given below. Tatnall (1942, p. 198) states that this species is common in woods in southern Accomac and northern Northampton Counties, Virginia.

MARYLAND: Worcester Co.: In thicket, south of Pocomoke City. Sept. 23, 1928. John Bright. (Carnegie).

VIRGINIA: Accomac Co.: Assateague Island, at causeway from Chincoteague Island. Aug. 1963. Reed; woods N of Accomac. June 6, 1955. Reed 41623; woods, Rt. 647. N of Locustville. June 5, 1955. Reed 39957; pinewoods, Metomkin Inlet Road, near Daugherty. Sept. 11, 1963. Reed 65496; edge of woods, E of RR, 3/4 mi. N of Belle Haven. Tatnall 2788 (GH); deciduous woods, N of Accomac. Sept. 23, 1928. John Bright. (Carnegie). Northampton Co.: Woods, 3 mi. SW of Eastville, Savage Neck. Oct. 22, 1955. Reed 37802; edge of woods, 1 mi. E of Bayford. June 8, 1958. Reed 41411.

The following specimens have been found along the lower Chesapeake Bay from Northern Neck (apparently only on the Rappahannock River side of the peninsula) to the Atlantic Ocean on the various peninsulas.

VIRGINIA: Richmond-Lancaster Co. line: Woods, Rt. 600, near county line in Richmond Co. May 27, 1956. Reed 37724; Mathews Co.: Woods along North River at junctions of Rts. 14 and 3, near Home of John Clayton. Aug. 7, 1959. Reed 44009; damp woods, 2 mi. SW of Mathews. Aug. 7, 1959. Reed 43966; Gloucester Co.: Wet woods near Achilles. Aug. 7, 1959. Reed 44024; York Co.: Woods near Grove. Aug. 8, 1959, quite common. Reed 44156; edge of woods, Rt. US 17, near Yorktown. Aug. 7, 1959. Reed 44031; Warwick Co.: Wooded slopes along Skiffs Creek. Aug. 8, 1959. Reed 44149; Princess Anne Co.: Woods, 3 mi. W of Pungo, Rt. 603. Aug. 27, 1958. Reed 42652; Southampton Co.: Woods along Nottaway River, Rt. 258, S of Franklin. Aug. 16, 1957. Reed 40086; Nansemond Co.: Pine barrens near Cox Landing. Aug. 14, 1939. L.B.Smith & A.R.Hodgdon 972. (WVaU).

Other Virginia records are: Bedford Co.: Woods near Boonsboro. Oct. 11, 1964. Reed 68675; Montgomery Co.: Woods on Brush Mt., Rt. 460, 2658 ft. elev., 5 mi. NW of Blacksburg. June 13, 1962. Reed 56506; Amherst Co.: Rt. US 60, 5 mi. W of Amherst. Oct. 11, 1964. Reed 68884; Rockbridge Co.: Rt. US 60, at Buena Vista. Oct. 11, 1964. Reed; Mecklenburg Co.: Wooded slopes along Pole Branch, Rt. 58, 1 mi. E of Boydton. May 10, 1965. Reed 69467; Botetourt Co.: Limestone cliffs at James River, Rt. 220. S of Iron Gate. Sept. 18, 1964. Reed 68885; woods near Fincastle. June 12, 1964. Reed 66605; Patrick Co.: Spoon Creek, N of Nettle Ridge, 5 mi. W of Henry Co. line, alt. 300 meters. June 30, 1938. F.R.Fosberg 15338. (WVaU); Craig Co.: Summit, Potts Mt., Rt. 311, N of New Castle. June 17, 1964. Reed 68993; Tazwell-Smyth Co.: Brushy Mt., summit, 3064 ft. elev. June 17, 1964. Reed 69013; Dickerson Co.: Georges Fork Gap, near Summit, Rt. 83. June 16, 1964. Reed 69057; Wise Co.: Pound Mt., Rt. 23, near Pound Gap. June 16, 1964. Reed 69059. In USNH: Alleghany, Isle of Wight, Roanoke, Smyth, Bedford, Giles, Buckingham, Nansemond, Norfolk, Warwick Counties.

WEST VIRGINIA: Barbour Co.: Laurel Mt. June 26, 1951. A.H.Haller. (WVaU); in woods near Boulder. Sept. 28, 1958. Karl Nestor. (Carnegie); Rt. 250, just N of Calhoun. July 18, 1965. Reed 69957; Braxton Co.: Woods along B&O RR tracks, Rt. 4, Gassaway. Aug. 29, 1959. Reed 45535; Sugar Creek, S of Gassaway. June 16, 1953. F.J. Boggs. (WVaU); Cabell Co.: Overgrown pasture, overlooking Holswade Park. July 17, 1939. F.A.Gilbert. (WVaU; SABC-52); Calhoun Co.: Pink. July 15, 1933. Ray Harris. (WVaU); banks, Little Kanawha River. July 4, 1890. C.F.Millspaugh 357. (WVaU); Arnoldsburg. July 1, 1932. Earl L. Core. (WVaU); Doddridge Co.: Along Rt. 55, 3 mi. W of Ashley. July 8, 1937. Earl L. Core 5586. (WVaU); near West Union. Aug. 3, 1943. Alvin Allison. (WVaU); Clay Co.: 1 mi. N of Clay. July 19, 1937. Earl L. Core. (WVaU); Fayette Co.: New River Gorge, Cotton Hill Station. July 7, 1932. Earl L. Core. (WVaU); Greenbrier Co.: Near Alta. Sept. 4, 1940. Wm. Basil Fox. (WVaU); Harrison Co.: Zeising. Aug. 1933. Robt. F. Martin 227. (WVaU); Shinn's Run, Shinston. July 12, 1939. C.L.Righter. (WVaU); Rt. 50, 2 mi. W of Clarksburg. July 17, 1965. Reed 69936; Kanawha Co.: Woods near Institute. July 8, 1931. Bot. Exped. W.Va.U. (WVaU); Watts Hill. Aug. 6, 1934. Miss Leslie Greenlee. (WVaU); woods, Queen Shoals. Aug. 1935. F.C.Randolph 14. (WVaU); Lewis Co.: Along Rt. 119, 2 mi. above Alum Bridge. June 22, 1957. E.A.Bartholomew & Dale Wilson. (WVaU); woods just N of Ireland, Rt. 4. Aug. 29, 1959. Reed 45546; Marion Co.: Old Grafton Road, clay soil in woods. July 17, 1929. T.E.Welch. (WVaU); Pricketts Creek. July 5, 1932. Fairmont State Teachers College. (WVaU); divide between State Road Run and Dudley Fork of Flat Run. July 5, 1937. Earl L. Core 5228. (WVaU); Marshall Co.: Hillside off Rt. 250 near Georgetown near Greene Co., Pa. line. July 17, 1965. Reed 69961; McDowell Co.: Johnny Cake. Sept. 2, 1941. Mildred L. Cox. (WVaU); Anawalt. Aug. 14, 1961. D.J.Music. (WVaU); Mercer Co.: Brush Creek Falls. July 16, 1931. Meade McNeil. (WVaU);

Pinnacle Rock. Sept. 1, 1940. Wm. Basil Fox. (WVaU); Mingo Co.: Chattaroy. 1955. Ben Millard. (WVaU); Monongalia Co.: South Park Bridge, Morgantown. July 10, 1914. John L. Sheldon. (WVaU); woods, Rt. 7, 1 mi. E of Bula. July 17, 1965. Reed 69950; near Behler. Sept. 10, 1929. Earl L. Core. (WVaU); Uffington. Aug. 11, 1931. P.J.Zucchero. (WVaU); Halleck, 2100 ft. elev. June 27, 1933. A.H. Anderson & F. Paul Smith 121. (WVaU); road bank along top of Chestnut Ridge between Greer and Tryon. July 24, 1960. E.A.Bartholomew & M.C.Beals. (SABC; Reed Herb.); Greer. Sept. 15, 1923. R.C.Spangler. (WVaU); on Chestnut Ridge, S of Morgantown. Aug. 23, 1921. S.S.Dickey. (Carnegie); edge of woods, Rt. 19, near Davis Hollow. July 16, 1965. Reed 69935; Monroe Co.: Wayside. Aug. 1, 1940. Wm. B. Fox 7. (WVaU); thicket, Peters Mt. July 1, 1931. F.W.Hunnewell 11944. (WVaU); Nicholas Co.: Near Nettie. Aug. 9, 1940. Wm. Basil Fox. (WVaU); Powell Mt. June 1, 1952. E.A.Bartholomew. (WVaU); Ohio Co.: Serpentine Drive, Oglebay Park. June 18, 1929. P.D.Strausbaugh 252. (WVaU); Pleasant Co.: Woods, 4½ mi. E of St. Marys. July 24, 1954. Eldon Ross. (WVaU); Preston Co.: Independence. July 21, 1898. W.E.Rumsey. (WVaU); recently cut woods near Sarver Schoolhouse. July 16-17. 1918. John L. Sheldon. (WVaU; Carnegie); near Cooper's Rock. Aug. 2, 1947. W.E.Buker. (Carnegie); Putman Co.: Nitro, Rt. 35. July 1957. Earl L. Core 6417. (WVaU); Raleigh Co.: Common along highway near C.C.Camp. Aug. 25, 1940. John Paul Tosh. (WVaU); Randolph Co.: Huttonsville. Sept. 1, 1938. Eugene E. Hutton. (WVaU); Ritchie Co.: 6 mi. from Cairo. Summer 1945. Kathryn Atha. (WVaU); along bank of Rt. 53 on hill descending to South Fork on Hughes River. June 15, 1958. E.A.Bartholomew & M.C. Beals. (Carnegie); Summers Co.: Near Sandstone. June 30, 1933. Weldon Boone 220. (WVaU); Taylor Co.: Valley Falls. July 30, 1959. Geo. E. Constable. (WVaU); Tucker Co.: Frequent in woods near Thomas, Canaan Valley. Aug. 9, 1945. H.A.Allard 11654. (WVaU); Tyler Co.: Roadside, 8 mi. Ridge, McElroy Dist. July 8, 1956. E.A.Bartholomew & Dale Wilson, T-190. (WVaU); woods, Rt. 13, at summit of mountain, Tyler-Wetzel Co. line. July 17, 1965. Reed 69943; Upshur Co.: Sago. July 25, 1946. E.C. & E.R.Grose. (WVaU); woods near Rock Cave. Aug. 29, 1959. Reed 45553; Wayne Co.: Missouri Branch, Cabwaylingo State Forest. L.W.Wilson & J.E.Friedel. (WVaU); same loc. June 13, 1952. Marie Overholts. (Carnegie); 1 mi. N of Ft. Gay. Sept. 12, 1931. Isabelle Lycan 107. (WVaU); Webster Co.: Edge of woods, Camp Caesar near Cowan. July 18, 1936. Louis Williams 488. (WVaU; Carnegie); same loc. Aug. 10, 1940. Wm. Basil Fox. (WVaU); Wetzel Co.: Smithfield. Summer 1936. Robt. H. Wagner. (WVaU); ridge between Hundred and Earnshaw. July 1, 1931. Oscar Haught 571. (WVaU); Rt. 7, 3 mi. E of Suter. July 17, 1965. Reed 69953; Long Drain Run, 1 mi. E of Hundred. July 17, 1965. Reed 69952; Wirt Co.: In old fields, 1 mi. up Little Kanawha River from mouth of Reedy Creek. Sept. 9, 1943. E.A.Bartholomew, W-1279. (WVaU). In USNH: Cabell, Lewis, McDowell, Monroe, Monogalia, Upshur, Preston, Wirt, Taylor, Webster, Tucker and Summers Counties.

WESTERN PENNSYLVANIA: Allegheny Co.: Toms Run above Dixmont. Oct. 16, 1915. O.E.Jennings. (Carnegie); Fayette Co.: Near Wymps Gap along road from Haydentown. Oct. 7, 1934. L.E.Lincoln. (Carnegie); on rocky mountain slope above North Branch of Rubles Run, SE of Haydentown. Aug. 24, 1940. O.E.Jennings et al. (Carnegie); Somerset Co.: near Somerset. Oct. 1950. Frank Curto. (Carnegie); Greene Co.: Along Duley Creek, Perry Twp. April 14, 1951. W.E.Buker. (Carnegie); Westmoreland Co.: Mt. Pleasant Twp., field near Brush Creek. July 14, 1900. O.P. Medgser & J.A.Shafer. (Carnegie); Mt. Pleasant. Oct. 12, 1915. (Carnegie); Mt. Pleasant. July 13, 1919. S.H.Williams. (Carnegie; WVaU); 4 mi. E of Mt. Pleasant. Aug. 1934. Thomas Chilcote, Jr. (Carnegie); Greene Co.: Hillside near Georgetown on Marshall Co., W.Va. line. July 17, 1965. Reed 69961.

Sourwood has been cultivated farther northward and eastward. Several nurseries in the East sell the sourwood tree for ornamentation. The following are a few of the localities from which I have obtained specimens.

MARYLAND: Baltimore City; Cultivated along street, University Parkway at Keswick Road. Aug. 29, 1963. Reed; Harford Co.: Jarrettsville, cultivated in yard. Nov. 4, 1962. Reed.

PENNSYLVANIA: Bucks Co.: Cultivated in lawn, Rt. 202, tree 14-16 ft. tall, just S of Doylestown. July 12, 1962. Reed 57712.

NEW JERSEY: Monmouth Co.: Several large trees, 12-25 ft. tall, edge of pine woods, Rt. 9, near Gordons Corners. July 24, 1960. Reed 47260; along Rt. 9 about 14 good size trees, many small ones in woods, near Gordons Corners, N of Freehold. Sept. 23, 1961. Reed 53252; 3 trees, Rt. 9, just N of Clayton Road. Sept. 23, 1961. Reed 53256.

CONNECTICUT: Fairfield Co.: Cultivated, Southport. Aug. 31, 1964. Reed.

Galax aphylla L.

Galax belongs to the family Diapensiaceae. It is an evergreen herb, which has a long spike of white flowers standing about one foot tall, arising with a group of leaves from a short rhizome at the surface of the ground. Because there are no leaves on the stem of the spike, the name aphylla is appropiate. Map 2.

Fernald (1950, p. 1136) gives the natural range of this species as Virginia and West Virginia, south to Georgia and Alabama, and as

being cultivated and locally escaped north to Massachusetts. Massey (1961, p. 161) cites 21 counties in Virginia for this species, the counties ranging from near the Atlantic Ocean (Princess Anne Co.) and then westward into the Piedmont, Blue Ridge and Alleghanian zones, more or less along the drainage of the James River and its tributaries, as far north as Augusta Co. Strausbaugh and Core (1958, p. 718) list nine counties, in dry woods in the mountainous areas of West Virginia, as far north as Preston Co. and formerly to Monongalia County.

The following are new or additional county records that extend the range of Galax aphylla northward along the west side of the Chesapeake Bay to near the mouth of the Potomac River. This species has not been found north or east of the Potomac River, growing naturally.

VIRGINIA(Chesapeake Coastal Plain):Princess Anne Co.: Little Creek. Sept. 12, 1935. Fernald, Long & Fogg 4985. (US-1697158); Norfolk Co.: Near Norfolk. May 17, 1877. Lester F. Ward. (Reed Herb. 40212); Smith Lake. May 15, 1903. G.S.Miller. (US-646772 and 644774); Nansemond Co.: Bowers Hill, 7 mi. W of Portsmouth. May 31, 1882. Lester F. Ward. (Reed Herb. 40211; US-136119); Suffolk. June 11, 1899. Wm. Palmer. (US-343931); Southampton Co.: Franklin. Oct. 25, 1911. W.W.Eggleston 7789. (US-624140); James City Co.: Bluff along College Park, 3 mi. from Williamsburg. Aug. 2, 1940. Baldwin 797. (US-1789820); Middlesex Co.: Wooded slopes, SE of Hartfield, near Piankatank River. Aug. 7, 1959. Reed 43942; Lancaster Co.: Woods along John Creek, Merry Point. May 26, 1962. Reed (56159) and Winifred Harley; Northumberland Co.: Oak-hickory wooded slopes, 2 mi. N of Wicomico Church. May 27, 1956. Reed 39157.

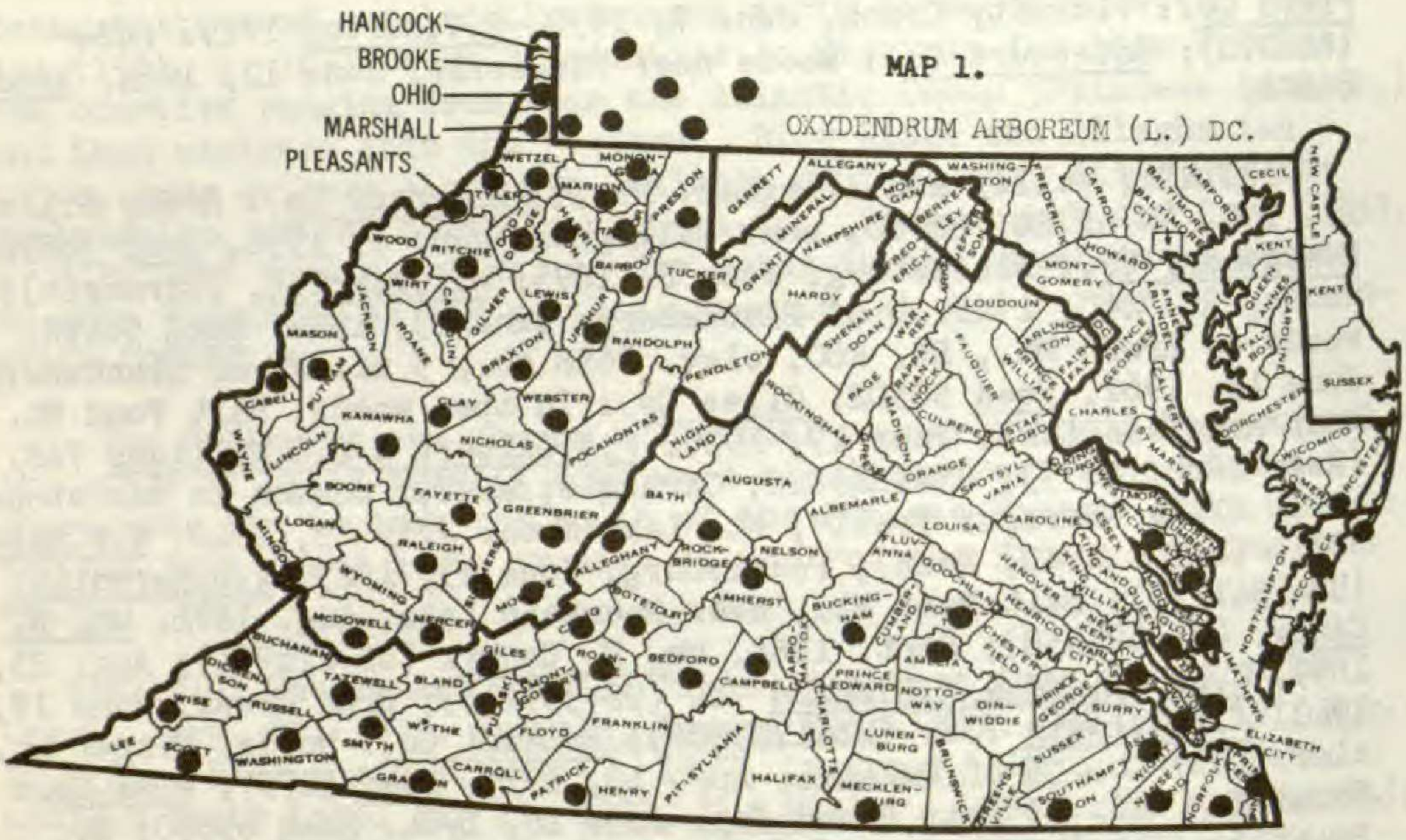
VIRGINIA(Piedmont):Henry Co.: Wooded hillsides, Rt. 57, along Smith River, near Bassett. Apr. 13, 1952. Reed 28191.

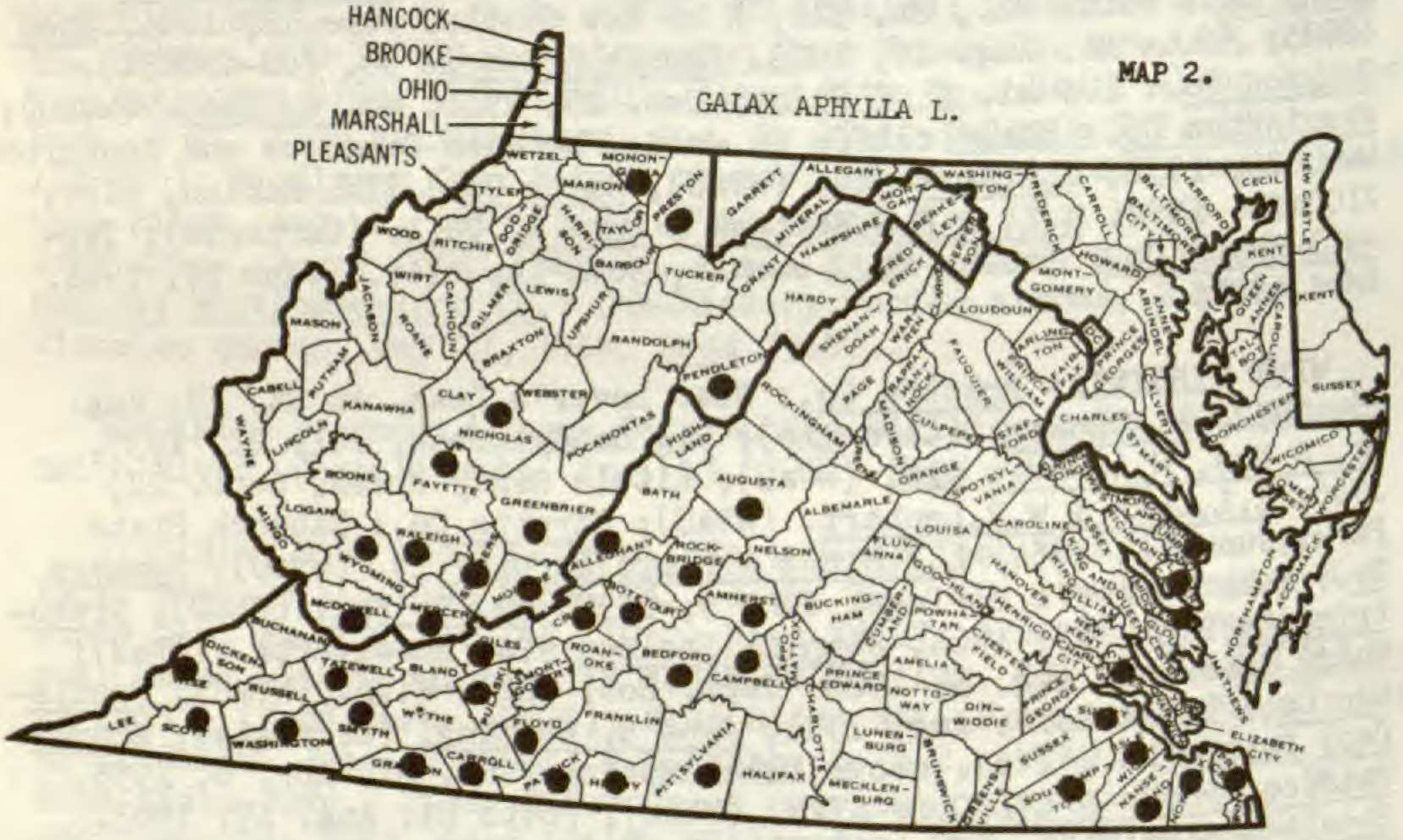
VIRGINIA(Blue Ridge):Carroll Co.: Woods just W of Cana. Apr.12, 1952. Reed 28134; Blue Ridge Mt., elev. 3000 ft., rocky woods, S of Fancy Gap, Rt. 52. Apr. 12, 1952. Reed 28127; Blue Ridge Parkway near Galax, large colonies in dense woods. Aug. 28, 1947. H.N.Moldenke 19253. (Reed Herb. 40735); Blue Ridge Nat. Pkwy. near Piper's Gap, SE of Galax. June 18, 1961. G.B.Rossbach 2642. (WVaU); Amherst Co.: Blue Ridge Pkwy., Upper Otter Creek Overlook, elev. 1005 ft., Mile #58. June 15, 1963. Reed 62447; Slatey Gap, Geo. Washington Nat. Forest. June 16, 1940. Baldwin 701. (US-1789804); Patrick Co.: Woods near entrance to Fairy Stone State Park, Rt. 57. Apr. 13, 1952. Reed 28123; rocky bluff near Stuart. July 2, 1940. Baldwin 738. (US-1789817); Rockbridge Co.: Natural Bridge. June 1, 1891. T.R.Churchill. (US-517773); Sept. 13, 1907. E.B.Bartram & B. Long. (US-607328); Bedford Co.: Peaks of Otter. July 18, 1906. Wm. Palmer 86. (US-605082 and 1438763); "Bedford Co." June 1868. A.H.Curtiss. (Carnegie);

Floyd Co.: Vicinity Creek. June 7, 1930. C.V.Morton 1729. (US-1846050); Botetourt Co.: Woods near Fincastle. June 12, 1964. Reed 66606.

VIRGINIA(Valley and Alleghany Mts.):Alleghany Co.: Rocky hillside, Rt. 159, SW of Rt. US 60, near Callaghan. Jan. 1, 1956. Reed 36896; Montgomery Co.: Blacksburg. June 8, 1895. W.A.Murrill. (Carnegie); woods, Rt. 460, 1 mi. N of Blacksburg. June 13, 1962. Reed 56498; woods on Brush Mt., Rt. 460, elev. 2658 ft., 5 mi. NW of Blacksburg. June 13, 1962. Reed 56502; Giles Co.: In open woods, Salt Pond Mt. near Mountain Lake. June 17, 1939. F.A.Gilbert & L.G.Williams 768. (Reed Herb. 40733; US-1849828; Carnegie; WVaU); common in sandstone soil, along "Warspur Trail", Mt. Lake area. July 23, 1940. A.B.Massey 3921. (SABC: WVaU; Reed); Pearisburg. June 23, 1923. A.B.Meredith. (US-1341175); Salt Pond Mt., near Mountain Lake. Aug. 1876. Wm. M. Canby. (US-681558); Sept. 1884. Wm. M. Canby. (US-226931); Aug. 25, 1899. C.L.Pollard & W.R.Maxon 74. (US-357113); Rich Creek. June 18, 1940. J.T.Baldwin 708. (US-1789806); Pulaski Co.: Woods, Draper Mt., elev. 3500 ft., S of Pulaski. Apr. 16, 1959. Reed 42757; Wise Co.: Pound Mt., Rt. 23 near Pound Gap. June 16, 1964. Reed 69060; St. Paul. June 24, 1940. Baldwin 716. (US-1789810); Craig and Allegheny Co.: Potts Mt., Rt. 311, N of New Castle. June 17, 1964. Reed 68995; Potts Mt. Aug. 19, 1903. Steele & Steele 36. (US-490034); Grayson Co.: 1.5 mi. E of Galax. Dec. 25, 1946. Wm. H. Todd. (WVaU); Washington Co.: Shale cliffs in woods, between Damascus and Konnarock. Mar. 26, 1952. G.B.Rossbach. (WVaU); Smyth Co.: Vic. Marion, elev. 2100 ft. 1892. N.L. & E.G.Britton & Anna M. Vail. (Carnegie); Tazwell-Smyth Co.: Brushy Mt., summit, 3064 ft. elev. June 17, 1964. Reed 69015.

WEST VIRGINIA: Preston Co.: Near Lover's Leap, on Rt. 58. Aug. 26, 1952. W.E.Buker. (Carnegie); Big Sandy Creek. July 22, 1937. Mr. & Mrs. H.A.Davis 916. (WVaU); Little Sandy Creek. Sept. 22, 1956. E.L.Core & W.R.Lenhart. (WVaU); Fayette Co.: Babcock State Park. June 11, 1954. L.E.Hicks & Floyd Bartley 13. (WVaU); Summers Co.: Near Barger's Springs. June 9, 1939. Wm. B. Fox. (WVaU); Greenbrier Co:Sept. 25, 1904. John L. Sheldon 994. Ronceverte. (WVaU); Muddy Creek Mt. Aug. 5, 1926. Dept. Bot. Univ. W.Va. (WVaU); Pendleton Co.: Smoke Hole. Aug. 1931. Jane S. Netting. (Carnegie); Monroe Co.: Peters Mt., 1 mi. above Sweet Springs, Rt. 81. Apr. 6, 1935. Maurice Brooks & E.L.Core 4723. (WVaU); Potts Mt. Aug. 19, 1903. Steele & Steele 36. (US-490034); SW of Glace. May 28, 1954. G.S.Rossbach. (Carnegie); Wyoming Co.: Pineville. June 23, 1940. Baldwin 773. (US-1789807); 9.5 mi. SE of Pineville. Aug. 9, 1940. L.W. & J.E.Wilson. (WVaU); Raleigh Co.: Park behind Wilson High School. June 10, 1941. John Paul Tosh 814. (US-1846279); Beckley. July 17, 1931. E.L.Core 3121. (WVaU); Boy Scout Camp at Beaver. June 4, 1940. John Paul Tosh 258. (WVaU); Mercer Co.: Pinnacle Rock. June 24, 1940.


HANCOCK
BROOKE
OHIO
MARSHALL
PLEASANTS
MAP 1.
OXYDENDRUM ARBOREUM (L.) DC.


HANCOCK
BROOKE
OHIO
MARSHALL
PLEASANTS
MAP 2.
GAIAX APHYLLA L.

Baldwin 715. (US-1789809); Old Lashmeet. July 1, 1948. Catherine Peeks. (WVaU); McDowell Co.: Welch. June 23, 1940. Baldwin 714. (US-1789808); Brown's Creek. July 4, 1928. Dept. Bot. Univ. W.Va. (WVaU); Monongalia Co.: Dille Farm near Morgantown. (Acc. Millspaugh, 1913, p. 327).

Hexastylis Raf.

The evergreen leart-leaved gingers, often called heartleaves, belong to the family Aristolochiaceae. These herbs have rather leathery leaves which are aromatic, and may be mottled silvery. The flowers appear in the spring with the new leaves, and are maroon with yellow markings on the inside. For the heartleaves the Potomac River is a natural barrier, and Hexastylis virginica is the most widely distributed species of the genus in Virginia and West Virginia.

There has been considerable confusion as to the limiting characters of the various species of heartleaves and as to their distribution in the northern area. Fernald (1950, p. 564, under Asarum, sect. Ceratasarum A.Br.) put H. heterophylla (Ashe) Small in synonomy under H. virginica (L.) Small, but kept H. menningeri (Ashe) Small as a separate species, suggesting that it might be a local form of H. virginica. Gleason (1952, Vol. 2: 62) listed both H. heterophylla and H. menningeri as synonyms under H. virginica. Blomquist (1957, p. 255) monographed the North American species of Hexastylis, and recognized H. virginica (incl. H. menningeri) and H. heterophylla. Some herbarium sheets he annotated first H. virginica he later changed to H. heterophylla. In addition to these two species he discussed the distribution of several other species of this genus in Virginia and West Virginia, as H. lewisii, H. shuttleworthii, H. arifolia and its variety ruthii. Also he indicated that H. minor barely reaches the Virginia border in north-central North Carolina.

Key to the species of Hexastylis in Virginia and West Virginia*

1. Style-extensions above the stigmas bifid to the stigmas, the lobes usually divergent at anthesis; leaf-blades triangular- to ovate-sagittate or -subhastate; when variegated, the light green areas between the principal veins; calyces narrowly to broadly flask-shaped or ovate, the lobes erect or more or less spreading, without a flange above and smooth within the tube.. .....6. H. arifolia.

* Key adopted from Blomquist, Brittonia, 8: 262-263. 1957.

1. Style-extensions above the stigmas not bifid to the stigmas, only notched at the apex; leaf-blades cordate to orbicular-cordate or orbicular-cordate or retuse; when variegated, the light green areas along the principal veins; calyces ridged-reticulate inside the tube, extensive and of high relief; calyces not flash-shaped, not contracted at the base.

   2. Calyces without a flare about the middle or above, campanulate-urceolate, thin-walled, large, 3-5 cm. long by 2.5 cm. wide; ovary wholly superior, grooved below the stamens; style-extensions relatively long and slender; ridge-reticulations inside the tube a somewhat regular open network..... .....4. H. shuttleworthii.

   2. Calyces with a more or less prominent flare about the middle or above.

      3. Calyces cylindric with a flare above the middle.

         4. Plants with two kinds of rhizomes, some long and slender, the leaves therefore solitary and scattered, others short and freely branching, a few leaves therefore grouped, flower-bearing; calyces thin, with many vertical ridges inside the tube, the spreading lobes with long, whitish hairs inside; ovary superior..... .....3. H. lewisii.

         4. Plants with only short and freely branching rhizomes, the leaves therefore always grouped.

            5. Calyx-lobes relatively short, 3-3.5 mm. long, erect to slightly spreading; ridged-reticulations inside the calyx-tube consisting of a close, irregular network of ridges; ovary about one-third inferior; leaf-blades cordate with mostly rounded apices to orbicular-cordate or retuse...1. H. virginica.

            5. Calyx-lobes relatively long, 7-10 mm. long, ascending to moderately spreading; ridged-reticulations inside the calyx-tube consisting of distinct, vertical ridges, joined by a somewhat open, irregular network of ridges; ovary usually superior; leaf-blades cordate with obtuse to acute apices rarely orbicular-cordate or retuse, the basal lobes often overlapping over the petiole....2. H. heterophylla.

      3. Calyces cylindro-campanulate with a prominent flare about the middle or slightly above, contracted above this, the lobes broad, about 12 mm. at the rounded base, strongly spreading; ridged-reticulations inside the calyx-tube consisting of a few distinct vertical ridges joined by many low, rounded ridges, the spaces between pit-like; leaf-blades prevailingly cordate with acute to obtuse apices.....5. H. minor.

1. Hexastylis virginica (L.) Small, Flora Southeastern United States, p. 1131. 1903; Blomquist, Brittonia, 8: 277. 1957. Map 3.

Syn.: Asarum virginicum L., Sp. Pl., p. 442. 1753; Heterotropa virginica (L.) A.Gray, Lond. Jour. Bot., 1: 225. 1842; Asarum menningeri Ashe, Jour. Elisha Mitchell Soc., 14: 35. 1897. (W.Va. to Carolina); Hexastylis menningeri (Ashe) Small, in Britton, Manual, 348. 1901.

Massey (1961, p. 86) listed 17 counties in Virginia for H. virginica in the following geographical zones: Chesapeake Coastal Plain-- Gloucester; Middle Coastal Plain-- Nansemond, James City, King William; Fall Belt-- Henrico; Piedmont-- Amelia, Louisa, Campbell, Henry; Valley and Alleghenies-- Botetourt, Rockbridge, Augusta, Montgomery, Wythe, Smyth, Scott, Washington. I have collected H. virginica in 14 additional counties in Virginia, extending the known range in this state north to the southern side of the Potomac River, from Northumberland Co. to Stafford Co. This species has never been found growing naturally on the north side of the Potomac River.

Fernald (1950, p. 564) gave the range as "Eastern Virginia to West Virginia, south to South Carolina and Tennessee". In southeastern Kentucky it is known from Letcher, McCreary and Harlan (Reed 7735A) Counties.

Strausbaugh and Core (1953, p. 322) give as the range of this species in West Virginia "Rich woods, frequent throughout the State, especially so on the western slopes of the Alleghenies; not noted east of the mountains, nor in the northern panhandle". However, H. heterophylla is not recognized, although H. menningeri is, but said to be similar to H. virginica.

VIRGINIA (Chesapeake Coastal Plain): Gloucester Co.: Gloucester. July 7, 1924. Meredith. (PA); Lancaster Co.: Woods along John Creek, Merry Point. May 26, 1962. Reed (56144) and Winifred Harley; wooded ravine, just SE of Lively. May 27, 1956. Reed 39126; low woods, 1 mi. N of Moraticco near Litwalton. May 27, 1956. Reed 37725; Middlesex Co.: Wooded slopes, NE of Hartfield, near Piankatank River. Aug. 7, 1959. Reed 43940 and 43941 (east of); Northumberland Co.: Damp pinewoods, Clark's Mill, 1 mi. N of Heathsville. June 1, 1946. Reed 5095 and 5125; same loc., May 15, 1954. Reed 33270; oak-hickory wooded slopes, 2 mi. N of Wicomico Church. May 27, 1956. Reed 39156; wooded ravine, 1 mi. S of Wicomico Church, Rt. 200. May 27, 1956. Reed 39140.

VIRGINIA (Middle Coastal Plain): New Kent Co.: Woods, Rt. 30, 4 mi. N of Barhamsville. July 7, 1961. Reed 51149; Isle of Wight Co.:

Sandy wastes between Zuni and Walters. Apr. 20, 1960. Reed 45154; sandy pine barrens, S of Zuni. Apr. 8, 1937. Fernald & Long 7009. (US-1699737): King & Queen Co.: Woods along Rt. 360, near Mattaponi River. June 29, 1954. Reed 34013; Prince Georges Co.: Wooded slopes, Garysville near Walls Run, Rt. 10. Apr. 9, 1960. Reed 46084; Richmond Co.: Along stream in low woods, ½ mi. SE of Warsaw. Apr. 22, 1946. Reed 4444; wooded slopes NE of Warsaw, on road to Callao. May 30, 1946. Reed 4949 and 4822; along stream SE of Warsaw. May 30, 1946. Reed 4977; wooded slopes, Chinn's Mill. May 31, 1946. Reed 5018; edge of pond at Ivondale near Farnham. June 5, 1954. Reed 33304; James City Co.: Low woods around pond, 3 mi. S of Williamsburg, on Jamestown Road. July 7, 1961. Reed 51130; Norfolk Co.: Dismap Swamp. Wm. H. Seaman. (US-786538); Nansemond Co.: Suffolk. June 10, 1899. Wm. Palmer & Paul Bartsch. (US-343925); Apr. 30, 1898. F.V.Coville & T.H.Kearney, Jr. 56. (US-355687); Southampton Co.: Shaded bank near Blackwater River, 1 mi. SW of Zuni. Apr. 6, 1937. Arthur S. Pease 25847. (US-2050790); Surry Co.: E of Carier Point. Fernald & Long 7815. (GH).

VIRGINIA (Fall Belt): Chesterfield Co.: Deep ravine, Rt. 10, 1½ mi. SE of Turnpike #95. Apr. 4, 1964. Reed 68214; Stafford Co.: Woods, Rt. 17, near Falmouth, 2 mi. NW of Fredericksburg. Aug. 13, 1962. Reed 58225; 3.5 mi. E of Falmouth. F.J.Hermann 10547. (GH, NY); Caroline Co.: Swampy woods, Rt. 301, 2 mi. N of Bowling Green. Nov. 14, 1959. Reed 45831; hillside along Rt. 301, N of Reedy Creek, near Penola. Feb. 9, 1957. Reed 38555; wooded slopes near stream, Rt. 301, 3 mi. N of Dawn. Feb. 9, 1957. Reed 38558.

VIRGINIA (Piedmont): Brunswick Co.: Wooded bluffs along Meherrin River, S of Lawrenceville. May 12, 1945. M.L.Fernald 14819. (US-2003520; GH; GA; TENN); Pittsylvania Co.: Between Fall Creek and Danville. June 3, 1891. J.K.Small & A.A.Heller 226. (US-18261; GH; NY; PA).

VIRGINIA (Blue Ridge): Bedford Co.: May 15, 1872. A.H.Curtiss. (Carnegie).

VIRGINIA (Valley and Alleghenies): Lee Co.: Woods, Rt. 66, near Kentucky State Line. June 21, 1947. Reed 7735B; Bath Co.: N of Millboro Spring, in Allegheny Mts. Sept. 3, 1907. C.F.Wheeler. (US-643314); Richardson Gorge of Jackson River, elev. 1700 ft. May 3, 1938. C.H.Boardman. (Carnegie); Augusta Co.: Staunton. May 20, 1896. W.A.Murrill. (Carnegie); Smyth Co.: North Fork of Houston River Valley, elev. 2200 ft. June 22, 1892. N.L. & E.G.Britton & A.M.Vail. (Carnegie); Craig-Alleghany Co.: Near Sweet Springs. Sept. 13, 1903. Steele & Steele 300. (US-490278, also given for Monroe Co., W.Va.); Giles Co.: Near Cascades. Brown et al. May 30-June 9, 1890. (NY).

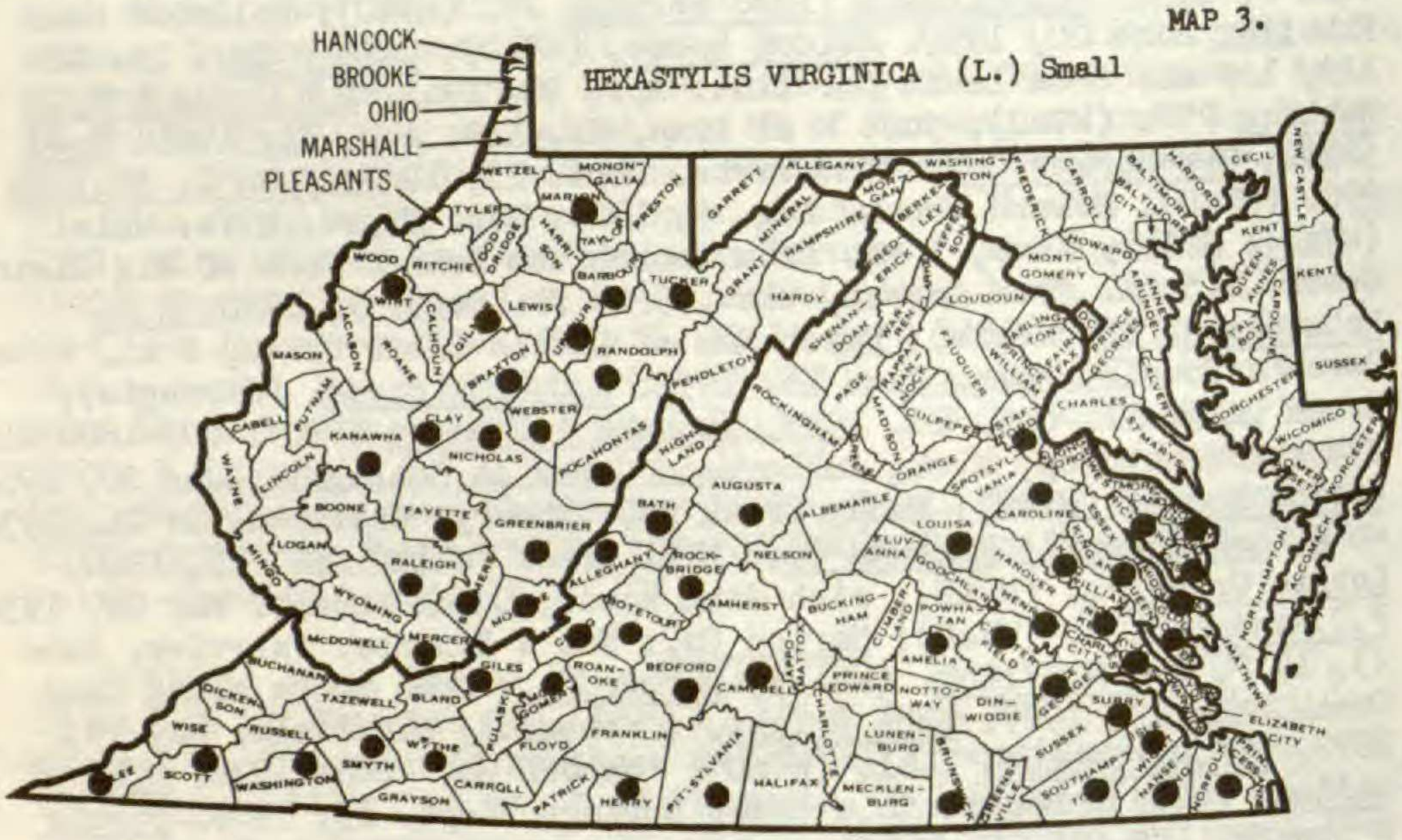
WEST VIRGINIA: Barbour Co.: Woods, 5 mi. S of Belington. Aug. 30, 1946. L.K.Henry. (Carnegie); Clay Co.: Lilly. Oct. 6, 1955. W.E.Sizemore & E.A.Bartholomew. (WVaU); Fayette Co.: Camp Beckwith. June 8, 1954. L.E.Hicks & Floyd Bartley 20. (WVaU); Bellwood near Ranelle. June 20, 1959. Weldon Boone. (WVaU); Gilmer Co.: Rt. US 119, 1.5 mi. from Lewis Co. line. Apr. 27, 1941. N.B.Green & M.G. Netting 957. (WVaU); just W of Linn, Rt. 119. Aug. 14, 1961. Reed 52192; Greenbrier Co.: Ronceverte. Sept. 25, 1940. John L. Sheldon 998. (WVaU); Howard Creek. Aug. 5, 1926. Bot. Exped. W.Va. Univ. (WVaU); Briery Knob, 1 mi. from Smokehouse Branch Fork of Big Clear Creek, 4.5 mi. from Anjean, elev. 3500 ft. Sept. 1, 1950. H.D. McCutcheon. (Carnegie); Beach Run of Little Clear Creek, 8 mi. from Beach's Tourist Home. June 16, 1951. H.D.McCutcheon. (Carnegie); North Caldwell. Oct. 20, 1933. Leonard & Leonard 16905. (US-1600324); limestone outcrop, along Culbertson Creek at Sunlight. June 20, 1959. Weldon Boone. (WVaU); Muddy Creek Mt. (Wherry, Castanea, 1: 24. 1936, as A. menningeri); Kanawha Co.: Mill Creek Falls. Apr. 25, 1940. Leslie Greenlee. (WVaU); rich damp woods, Queen Shoals. May 20, 1936. F.C.Randolph175. (WVaU); Marion Co.: Nan's Run near Fairview. June 23, 1917. Eva M. Fling. (WVaU); Mercer Co.: Open woods along Camp Creek. May 13, 1929. John Bright. (Carnegie); Bluefield. May 19, 1892. C.F.Millspaugh 1461. (WVaU); "Mercer Co." June 1934. Mildred Hadden. (WVaU); Monroe Co.: Sweet Springs. Sept. 13, 1903. Steele & Steele. (US-490278; NYBG, as A. menningeri); Nicholas Co.: May 1936. J.Creasy. (WVaU); Raleigh Co.: Rare, 1 mi. below Slabford. Apr. 22, 1940. John Paul Tosh. (WVaU); Slab Fork Creek. Apr. 6, 1940. J.P.Tosh 47. (WVaU); Tucker Co.: On Rt. 72, 10 mi. N of Parsons. May 30, 1954. J.L.Gable. (WVaU); Upshur Co.: French Creek. Apr. 6, 1924. Nelle Ammons. (WVaU); 8 mi. S of Buckhannon. Mar. 30, 1946. Edward C. Grose. (WVaU); French Creek. Apr. 19, 1935. Maurice Brooks. (WVaU); near Bucklin. Apr. 13, 1895. W.M.Pollack. (US-261533); "Upshur Co." May 9, 1897. W.M.Pollack. (US-490278 and 315229); Buckhannon. May 12, 1913. S.C.Grose (4651). (WVaU); Alexander. Aug. 29, 1938. E.L.Core. (WVaU); Webster Co.: Woods along Gauley River, Camp Caesar. Apr. 12, 1941. Mr. & Mrs. H.A.Davis 4702. (WVaU); Wirt Co.: On rock along bank of Standingstone Creek, ½ mi. below mouth of Deavers Fork. June 6, 1951. E.A.Bartholomew, W-3039. (WVaU); Braxton Co.: Near Frametown. Palmer 39545. (GH); Pocahontas Co.: Near Marlinton. Hunnewell 18951. (GH).

2. Hexastylis heterophylla (Ashe) Small, Flora Southeastern United States, p. 1131. 1903; Blomquist, Brittonia, 8: 272. 1957. Map 4.

Syn.: Asarum heterophyllum Ashe, Jour. Elisha Mitchell Soc., 14: 33-34. 1897; Asarum heterophyllum ochranthum Ashe, Jour. Elisha Mitchell Soc., 14: 34. 1897.

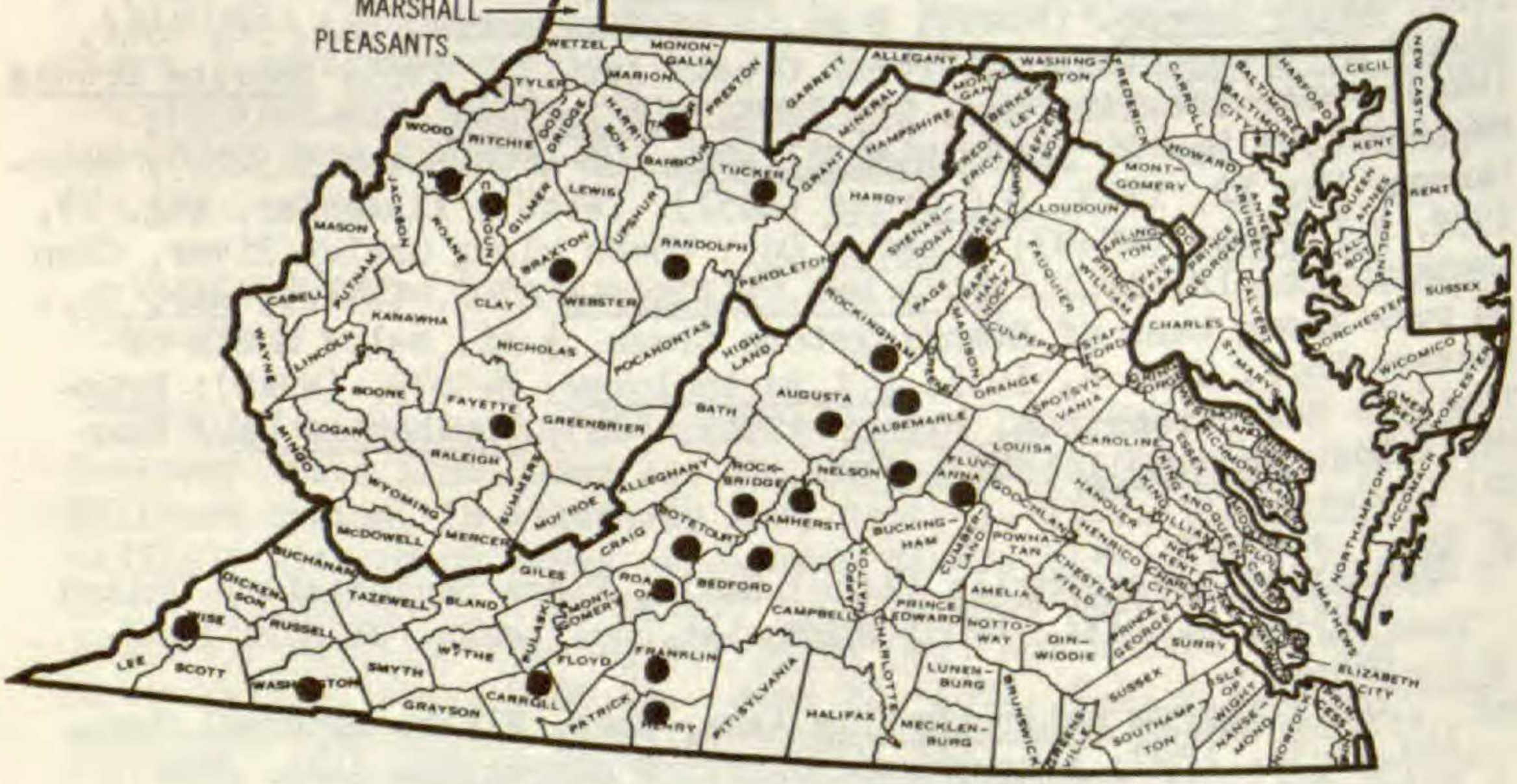
MAP 3.

HEXASTYLIS VIRGINICA (L.) Small



MAP 4.

HEXASTYLIS HETEROPHYLLA (Ashe) Small



VIRGINIA: Warren Co.: Between Happy Centre and Burrys Ferry. Aug. 16, 1897. Gerritt S. Miller, Jr. (US-413325); Rockingham Co.: Mt. Crawford, elev. 1200-1500 ft. May 5-13, 1893. (US-18264); foot and slopes of Blue Ridge Mts., Elkton, on Shenandoah River. Aug. 18, 1918. E.S.Steele. (US-2344506); Augusta Co.: West side of Blue Ridge, along creek. Apr. 25, 1921. W.W.Eggleston 17691. (US-1220664); Bedford Co.: A.H.Curtiss. May, 1866. (US; PA); Albemarle Co.: Howardsville. May 10, 1934. E.S.Rawlinson 156. (US-1622981); Roanoke Co.: Poor Mt., 2¼ mi. NW of Airport P.O. June 14, 1946. C.E.Woods, Jr. 6003. (US-2051013): Wise Co.: Pound Mt., Rt. 23, near Pound Gap. June 16, 1964. Reed 69061; Washington Co.: Wooded slopes, Abrams Falls, NW of Bristol, off Rt. 58. June 15, 1964. Reed 69095; Rockbridge Co.: Cedar Creek, rich woods, Natural Bridge. Apr. 28, 1886. Walter Deane. (WVaU).

WEST VIRGINIA: Fayette Co.: Rocky woods at Camp Beckwith. June 7, 1954. L.E.Hicks & Floyd Bartley 2111. (US-2178775); Taylor Co.: Boothsville, Hustead's Fork. June 1949. G.E.Constable. (WVaU); Braxton Co.: Glendon, Apr. 6, 1953. F.J.Boggs 18. (WVaU); sandstone ridge, 850 ft. elev., Little Kanawha River at Rt. 119, Falls Mills. Apr. 21, 1956. G.B.Rossbach 861. (WVaU); Randolph Co.: Pickens. Spring 1937. Howard Perine, (WVaU); Calhoun Co.: Pink. Apr. 19, 1933. Ray Harris. (WVaU); Wirt Co.: Burned over woods along Standingstone Creek, just below Hartley Road, Apr. 20, 1947. E.A.Bartholomew W-1677. (WVaU); Tucker Co.: Nestorville, St. George Road, 8 mi. W of St. George. Apr. 23, 1955. R.B. & J.Clarkson 303. (WVaU); Summers Co.: Madams Creek. May 5, 1932. Weldon Boone 41. (WVaU).

3. Hexastylis lewisii (Fern.) Blomquist & Oosting, Spring Flora Piedmont North Carolina, p. 50. 1948; Blomquist, Brittonia, 8: 274. 1957. Map 5 (dots).

Syn.: Asarum lewisii Fernald, Rhodora, 45: 398-400, t. 774-775. 1943; Hexastylis pilosifera Blomq., Castanea, 10: 75-80, f. 1-3. 1945. (N.C.).

VIRGINIA: Lunenburg Co.: Open oak woods, Rt. 137, 1 mi. NW of Dundas. May 10, 1965. Reed 69445; Mecklenburg Co.: Pine-oak woods, 1 mi. W of Brodnax. May 10, 1965. Reed 69456; low woods and slopes, 4 mi. E of South Hill, Rt. 58. May 10, 1965. Reed 69459; Brunswick Co.: Seward Forest, SE of Ante, very abundant. Sept. 15, 1944. M.L. Fernald & J.B.Lewis. (US-2003414); same loc., May 11, 1946. Fernald 14814. (US-2003529; GH); Oak woods, 1 mi. SE of Brodnax. May 10, 1965. Reed 69457; Greensville Co.: May 17, 1943. J.B.Lewis. (GH).

Plants which look intermediate between H. virginica and H. lewisii are: James City Co.: Wooded ravine, Lake Matoaka near Williamsburg. Mar. 19, 1948. Karl H. Zickrick, Jr. (WVaU); same loc.,

Mar. 16, 1948. Robeley M. Miles. (WVaU); New Kent Co.: On long peninsula formed by Chicahominy River and Diascond Creek, near Lanexa. Nov. 24-26, 1938. Neil D. Richmond. (WVaU).

4. Hexastylis shuttleworthii (Britton and Baker) Small, in Britton, Manual, 347. 1901; Blomquist, Brittonia, 8: 270. 1957. Map 5 (plus).

Syn.: Asarum shuttleworthii Britton and Baker, Jour. Bot., 36: 98. 1898; Asarum (Homotropa) macranthum Shuttl., mss. distr. Rugel, 1841; Asarum virginicum L. 'b' grandiflorum "Michx." ex Duchartre, in DC., Prodr., 15: 426. 1864; Asarum grandiflorum (Duchartre) Small, in Small & Vail, Mem. Torr. Bot. Club, 4: 150. 1894; non Klotzsch, Monatsber. Akad. Wiss. Berlin, 1859: 586. 1859; Asarum macranthum (Shuttl.) Small, Mem. Torr. Bot. Club, 5: 136. 1894; non Hook. f., Bot. Mag., t. 7022. 1888; Homotropa macranthum Shuttlew. ex Small, in Small & Vail, Mem. Torr. Bot. Club, 4: 150. 1894.

VIRGINIA: Wise Co.: Seymour. July 31, 1891. (DUKE).

WEST VIRGINIA: Summers Co.: In oak and beech woods near Barger's Spring. July 13, 1900. E.L.Morris 980. (US-388654); Monongalia Co.: Near Morgantown. Aug. 1931. Zucchero. (Zucchero, Jour. S. Appal. Bot. Club, 1: 7. 1936; Strausbaugh & Core, Flora of W.Va., Part II: 322, fig. 1953).

5. Hexastylis minor (Ashe) Blomquist, Brittonia, 8: 275 (minus). 1957.

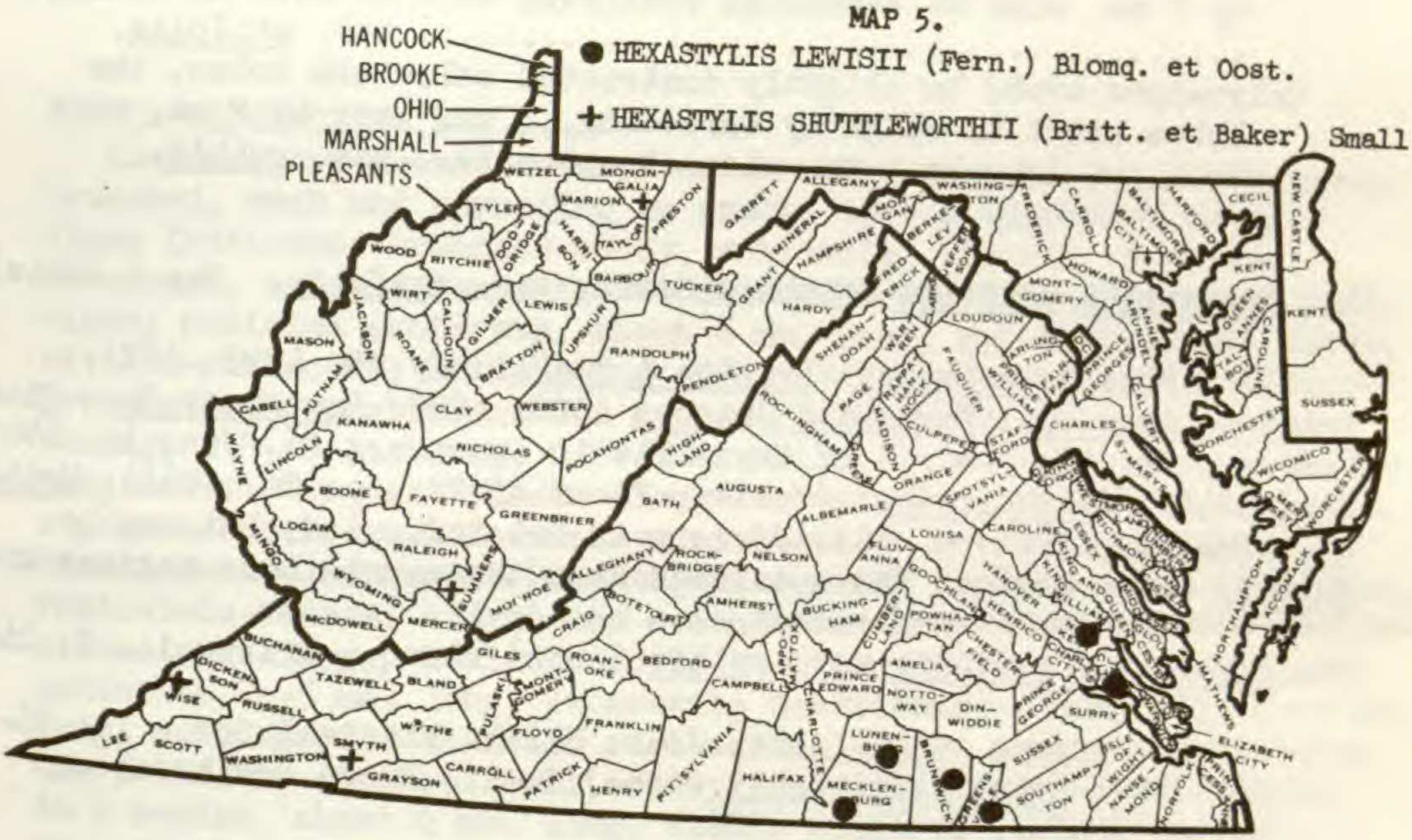
Syn.: Asarum virginicum sensu Ashe, Jour. Elisha Mitchell Soc., 14: 31. 1897; non Linn., Sp. Pl., 442. 1753; Asarum minus Ashe, Jour. Elisha Mitchell Soc., 14: 33-34. 1897. (Carolina to Tenn.).

This species is included here because it comes so close to the southern border of Virginia in the north central part of North Carolina (Granville, Orange and Wake Counties, which are just south of Halifax and Mecklenburg Counties, Virginia) that further search in south central Virginia will probably reveal it to be there.

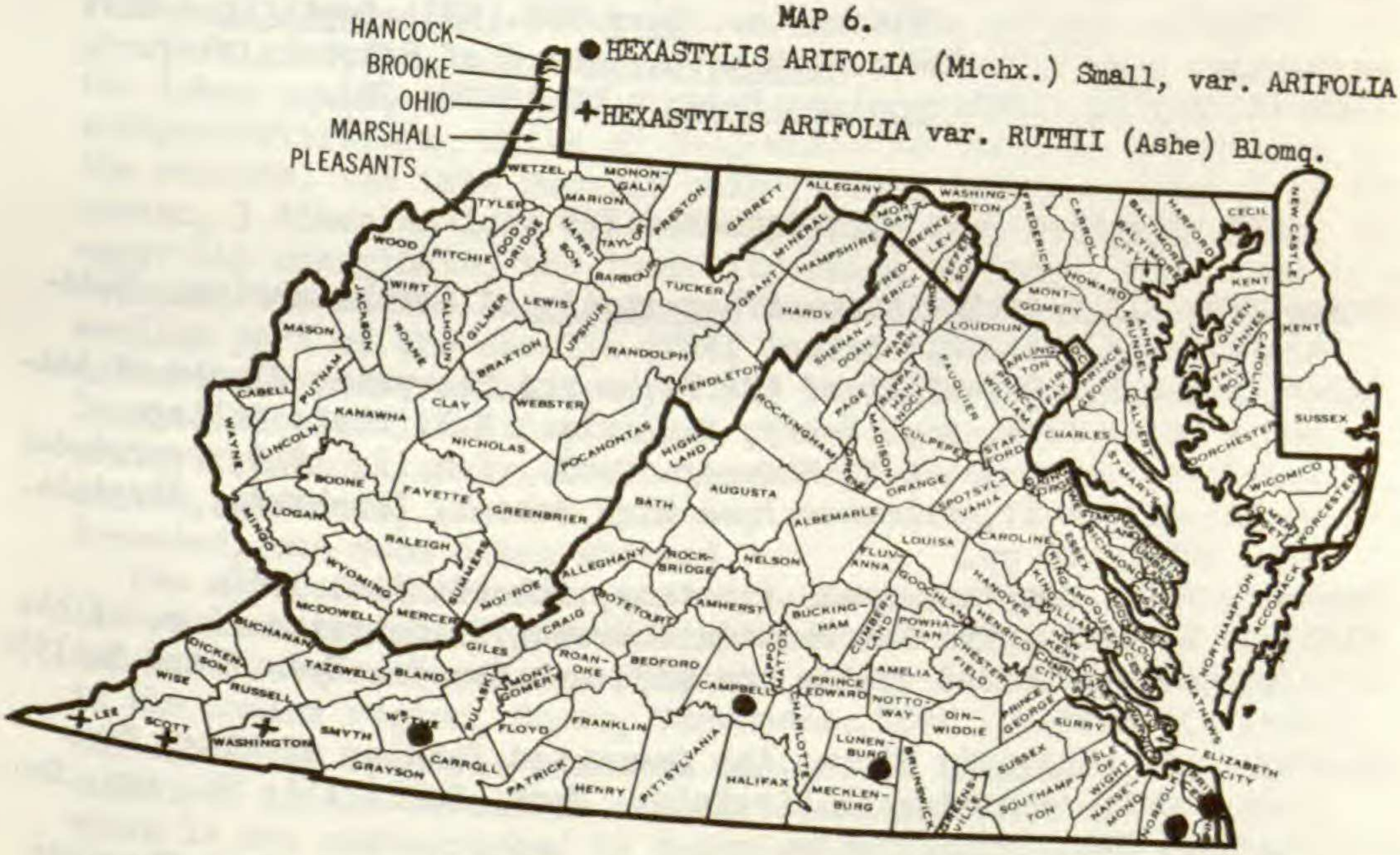
6. Hexastylis arifolia (Michx.) Small, Flora Southeastern United States, p. 1132. 1903; Blomquist, Brittonia, 8: 263. 1957.

Syn.: Asarum virginicum Walt., Fl. Car., 143. 1788; non Linn., Sp. Pl., 442. 1753; Asarum arifolium Michx., Fl. Bor. Am., 1: 279. 1803; Heterotropa arifolia (Michx.) A.Gray, Lond. Jour. Bot., 1: 225. 1842.

MAP 5.


HANCOCK
BROOKE
OHIO
MARSHALL
PLEASANTS
● HEXASTYLIS LEWISII (Fern.) Blomq. et Oost.
+ HEXASTYLIS SHUTTLEWORTHII (Britt. et Baker) Small

MAP 6.


HANCOCK
BROOKE
OHIO
MARSHALL
PLEASANTS
● HEXASTYLIS ARIFOLIA (Michx.) Small, var. ARIFOLIA
+ HEXASTYLIS ARIFOLIA var. RUTHII (Ashe) Blomq.

Calyx-tube flash-shaped, 3 cm. long by 3 mm. wide to 8 cm. long by 9 mm. wide at anthesis, the lobes more or less spreading.. .....var. arifolia.

Calyx-tube ovate to slightly contracted below the lobes, the lobes erect to slightly spreading, 2 cm. long by 2 mm. wide to 4 cm. long by 4 mm. wide at anthesis...var. ruthii.

6a. Hexastylis arifolia (Michx.) Small, var. arifolia. Map 6 (dots).

VIRGINIA: Norfolk Co.: Britton & Small. May 25, 1893. (NY); Princess Anne Co.: Fernald & Griscom 4388. (GH); Lunenburg Co.: Pine barrens, Rt. 40, 3 mi. E of Keysville in Lunenburg Co. June 14, 1963. Reed 62486; Campbell Co.: (Massey, Flora of Va., p. 86. 1961); Wythe Co.: (Massey, 1961: p. 86). Variety is not indicated, but may be ruthii, since most of the specimens from the mountainous regions are.

6b. Hexastylis arifolia var. ruthii (Ashe) Blomq., Brittonia, 8: 268. 1957. Map 6 (plus).

Syn.: Asarum ruthii Ashe, Jour. Elisha Mitchell Soc., 14: 35-36. 1897; Hexastylis ruthii (Ashe) Small, Flora Southeastern United States, p. 1137. 1903.

VIRGINIA: Lee Co.: Blackwater. Carr 960.(GH); Scott Co.: Vic. of Hinton. Carr 817. (GH); Washington Co.: N of Bristol, elev. 1800 ft. May 24, 1902. Addison Brown. (US-18270; GH).

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